

WHAT IS CLAIMED:

1. A lens for directing light output from a light source forwardly along an optical axis, said lens comprising:

a total internal reflection collector portion at a first end thereof, said collector having a focal length;

a projector portion at a second end opposite said first end; and

a transition portion extending between said collector portion and said projector portion, said lens having an overall length wherein said overall length is longer than the focal length of said collector portion.

2. The lens of claim 1, wherein said lens is glass.

3. The lens of claim 1, wherein said lens is an optical grade polymer.

4. The lens of claim 1, said collector portion comprising:

a rear surface;

an outer side wall; and

a cavity extending into said collector portion from said rear surface, said cavity having an inner side wall and a front wall, said light source disposed substantially within said cavity.

5. The lens of claim 4, wherein said outer sidewalls are outwardly tapered between said rear surface and said transition section.

6. The lens of claim 4, wherein said outer sidewalls are hemispherical between said rear surface and said transition section.
7. The lens of claim 4, wherein said outer sidewalls are elliptically curved between said rear surface and said transition section.
8. The lens of claim 4, wherein said front wall is convexly curved rewardly toward said light source.
9. The lens of claim 1, wherein a front surface of said projector section is convexly curved.
10. The lens of claim 9, wherein said curved front surface of said projector section and said outer side wall of said collector section are faceted.
11. The lens of claim 1, wherein a front surface of said projector section is elliptically curved.
12. The lens of claim 11, wherein said curved front surface of said projector section and said outer side wall of said collector section are faceted.

13. A lighting assembly comprising:

a lens for directing light output forwardly along an optical axis, wherein said lens includes:

a total internal reflection collector portion at a first end thereof, said collector having a focal length, said collector having a cavity therein,

a projector portion at a second end opposite said first end, and

a transition portion extending between said collector portion and said projector portion, said lens having an overall length wherein said overall length of said lens is longer than the focal length of said collector portion; and

a light source disposed substantially within said cavity, said light source having a central axis, said light source configured to emit a first portion of light output substantially along said central axis and a second portion of light output substantially divergent from said central axis;

wherein said collector portion collimates and homogenizes said first and second portions of light output to form a circular, uniformly illuminated near field image within said transition section and said projector section projects said circular image into a far field of said assembly.

14. The lighting assembly of claim 13, wherein said lens is glass.

15. The lighting assembly of claim 13, wherein said lens is an optical grade polymer.

16. The lighting assembly of claim 13, said collector portion comprising:
a rear surface;
an outer side wall; and
said cavity extending into said collector portion from said rear surface, said cavity having an inner side wall and a front wall, said light source disposed substantially within said cavity.
17. The lighting assembly of claim 16, wherein said outer sidewalls are outwardly tapered between said rear surface and said transition section.
18. The lighting assembly of claim 16, wherein said outer sidewalls are hemispherical between said rear surface and said transition section.
19. The lighting assembly of claim 16, wherein said outer sidewalls are elliptically curved between said rear surface and said transition section.
20. The lighting assembly of claim 16, wherein said front wall is convexly curved rearwardly toward said light source.
21. The lighting assembly of claim 16, wherein said light source is a light emitting diode.

22. The lens of claim 13, wherein a front surface of said projector section is convexly curved.

23. The lens of claim 22, wherein said curved front surface of said projector section and said outer side wall of said collector section are faceted.

24. The lens of claim 13, wherein a front surface of said projector section is elliptically curved.

25. The lens of claim 24, wherein said curved front surface of said projector section and said outer side wall of said collector section are faceted.

26. A flashlight assembly comprising:

- a housing having a first end and a second end;
- a power source disposed within said first end of said housing;
- a lens for directing light output forwardly along an optical axis disposed in said second end of said housing, wherein said lens includes:
 - a total internal reflection collector portion at a first end thereof, said collector having a focal length, said collector having a cavity therein,
 - a projector portion at a second end opposite said first end, and
 - a transition portion extending between said collector portion and said projector portion, said transition portion having a length wherein said length of said transition portion is longer than the focal length of said collector portion;

a light source disposed substantially within said cavity, said light source having a central axis, said light source configured to emit a first portion of light output substantially along said central axis and a second portion of light output substantially divergent from said central axis; and

means for selectively completing an electrical circuit between said power source and said light source to energize said light source.

27. The flashlight assembly of claim 26, wherein said light source is a light emitting diode.

28. A lens assembly for directing light output from a light source forwardly along an optical axis, said lens assembly comprising:

a total internal reflection collector component, said collector having an input end, an output end and a focal length; and

a projector component, said projector component having an input end and an output end, said projector component in fixed spaced relation to said collector component, wherein parallel rays of light entering said output end of said projector component are reflected and refracted by said lens assembly to fall entirely on said light source.

29. The lens assembly of claim 28, wherein said collector component and said projector component are glass.

30. The lens assembly of claim 28, wherein said collector component and said projector component are an optical grade polymer.

31. The lens assembly of claim 28, said collector portion comprising:

a rear surface;

an outer side wall; and

a cavity extending into said collector portion from said rear surface, said cavity having an inner side wall and a front wall, said light source disposed substantially within said cavity.

32. The lens assembly of claim 31, wherein said outer sidewalls are outwardly tapered between said rear surface and said output end of said collector.

33. The lens assembly of claim 31, wherein said outer sidewalls are hemispherical between said rear surface and said output end of said collector.

34. The lens assembly of claim 31, wherein said outer sidewalls are elliptically curved between said rear surface and said output end of said collector.

35. The lens assembly of claim 31, wherein said front wall is convexly curved rearwardly toward said light source.

36. The lens assembly of claim 28, wherein a front surface of said projector section is convexly curved.

37. The lens of claim 36, wherein said curved front surface of said projector section and said outer side wall of said collector section are faceted.